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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/688,573

10/20/2003

Robert M. Zeidman

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11/21/2006

ZEIDMAN TECHNOLOGIES, INC.  
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EXAMINER

WANG, BEN C

ART UNIT

PAPER NUMBER

2196

DATE MAILED: 11/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/688,573

**Applicant(s)**

ZEIDMAN, ROBERT M.

**Examiner**

Ben C. Wang

**Art Unit**

2196

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10-20-2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

## DETAILED ACTION

1. Claims 1-14 are pending in this application and presented for examination.

### ***Claim Rejections – 35 USC § 102(b)***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3, 5, 7, 8-10, 12 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Lehman et al., (hereafter 'Lehman'), (US Patent 4,796,179).

4. **As to claim 1**, Lehman discloses a method for developing a real-time operating system (Fig. 1; Col. 1, lines 46-48; Col. 4, lines 63-68; Col. 5, lines 1-2), comprising:  
specifying a set of  $n$  tasks (Col. 1, lines 33-38), task(1) through task( $n$ ), to be scheduled for execution, synthesizing source code for controlling execution of said  $n$  tasks (Abstract, lines 8-14; Col. 3, lines 1-8; Col. 5, lines 5-12; Col. 135, lines 17-24). Lehman also discloses specifying an algorithm (Col.3, lines 36-39; Col. 9, lines 56-61; Col. 32, lines 44-47; Col. 20, line 63 through Col. 21, line 20; Col.7, lines 29-32; Col. 16, lines 21-23; Col. 2, lines 36-39; Col. 9, lines 62-68; Col. 10, lines 1-2; Col. 32, lines 5-54) for scheduling the execution of said  $n$  tasks and synthesizing source code to implement a

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task scheduler (Fig. 4, element 24; Fig. 24; Fig. 26; Col. 2, lines 36-39; Col. 3, lines 36-39; Col. 9, lines 56-61; Abstract, lines 20-25; Col. 10, lines 8-12) that uses said scheduling algorithm for controlling execution of said  $n$  tasks.

5. **As to claim 8**, Lehman discloses that an apparatus for developing a real-time operating system (Fig. 1; Col. 1, lines 46-48; Col. 4, lines 63-68; Col. 5, lines 1-2), comprising: A computer; A software synthesis program on said computer (Col. 1, lines 5-8), wherein said software synthesis program comprises:  
means for specifying a set of  $n$  tasks (Col. 1, lines 33-38), task(1) through task( $n$ ), to be scheduled for execution; and means for synthesizing source code to implement a task scheduler (Col. 2, lines 36-39; Col. 3, lines 36-39; Col. 9, lines 56-61) to control execution of the methods (Col. 3, lines 1-8). Lehman also discloses means for specifying an algorithm (Col.3, lines 36-39; Col. 9, lines 56-61; Col. 32, lines 44-47; Col. 20, line 63 through Col. 21, line 20; Col.7, lines 29-32; Col. 16, lines 21-23; Col. 2, lines 36-39; Col. 9, lines 62-68; Col. 10, lines 1-2; Col. 32, lines 5-54) for scheduling the execution of said  $n$  tasks and means for synthesizing source code to implement a task scheduler (Fig. 4, element 24; Fig. 24; Fig. 26; Col. 2, lines 36-39; Col. 3, lines 36-39; Col. 9, lines 56-61; Abstract, lines 20-25; Col. 10, lines 8-12) that uses said scheduling algorithm for controlling execution of said  $n$  tasks.

6. **As to claims 2 and 9**, Lehman discloses the method and the apparatus including means for further specifying  $t$  *init-tasks* that are executed only once upon initial

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execution of said task scheduler,  $t$  being less than or equal to  $n$  (Col. 3, lines 36-39; Col. 9, lines 56-61 – when the execution of each code segment is initialized; Col. 32, lines 44-47).

7. **As to claims 3 and 10**, Lehman discloses the method and the apparatus including means for further specifying  $f$  *f-loop* tasks, each having an associated integer value  $li$  for  $i$  ranging from 1 to  $f$  and  $f$  being less than or equal to  $n$  (Col. 20, line 63 through Col. 21, line 20 – for loops using an incrementing or decrementing counter, i.e. Loop for  $l = 1$  to  $X$  (executing) block of statements), said task scheduler addresses the task scheduler executing the loops including a continuously executing loop such that each *f-loop* task executes exactly once every  $li$  times that the loop is executed (Col. 21, lines 13-19).

8. **As to claims 5 and 12**, Lehman discloses the method and the apparatus including means for further specifying  $c$  *call-tasks*,  $c$  being less than or equal to  $n$ , said task scheduler scheduling a *call-task* when another task requests that said *call-task* be executed (Col. 7, lines 29-32; Col. 16, lines 21-23).

9. **As to claims 7 and 14**, Lehman discloses the method and the apparatus where tasks are given priority values such that whenever the task scheduler chooses between scheduling multiple tasks, all of which being ready to be executed, said task scheduler

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chooses from among those tasks that have the highest priority values (Col. 2, lines 36-39; Col. 9, lines 62-68; Col. 10, lines 1-2; Col. 32, lines 5-54).

10. Claims 4 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lehman, in view of Xu et al., (hereafter 'Xu'), '*On Satisfying Timing Constraints in Hard-Real-Time Systems*', 1991, ACM.

11. **As to claims 4 and 11**, Lehman discloses the method and apparatus including means for specifying "loops" mechanism (Col. 20, line 63 through Col. 21 line 20). But, Lehman does not specifically disclose *p-loop* task. However, in an analogous art, Xu discloses means for specifying *p-loop* tasks, each having an associated integer value  $t_i$  for  $i$  ranging from 1 to  $p$  and  $p$  being less than or equal to  $n$ , the number  $t_i$  representing a number of regular time units (Sec. 2, 3rd paragraph, lines 1-4), said task scheduler including a timer that schedules each *p-loop* task  $i$  to be executed approximately once every  $t_i$  time units (Sec. 2, 3rd paragraph, lines 1-4; Sec. 2, 7<sup>th</sup> paragraph, on page 133 – A periodic process  $p$  can be described by a quadruple( $r_p$ ,  $c_p$ ,  $d_p$ ,  $prd_p$ ), where  $prd_p$  is the period,  $c_p$  is the worse case computation time required by process  $p$ ,  $d_p$  is the deadline,  $r_p$  is the release time). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Lehman and the teachings of Xu in order to provide a timing constraints mechanism in Lehman system. The motivation is that pre-run-time scheduling is essential if we want to guarantee that timing constraints will be satisfied in a complex hard-real-time system.

12. Claims 6 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lehman in view of Xu and further in view of David Lake (hereafter 'Lake'), (US 2004/0045003 A1).

13. **As to claims 6 and 13**, Lehman discloses the method and the apparatus including means for further specifying  $r$  preemptive- tasks (Col. 9, lines 52-56),  $r$  being less than or equal to  $n$ , said task scheduler including a timer mechanism that counts a specified period of time at which time if a preemptive-task is currently executing (Col. 35, lines 7-14) and continuing the execution of preemptive-task (Col. 9, line 64 through Col. 10, line 2). But, Lehman or Xu does not specifically disclose the task's state is stored and execution is given to said task scheduler to schedule another task until a later time when the task scheduler restores the state of said preemptive-task. However, in an analogous art, Lake discloses the task's state is stored and execution is given to said task scheduler to schedule another task until a later time when the task scheduler restores the state of said preemptive-task (Fig. 1; [0031]; [0026], lines 1-9; [0036], lines 1-6). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Lehman and Xu with the teachings of Lake in order to save/restore task control data within Lehman-Xu system during a preemptive-task interruption and task resumed. The motivation is to have its stack pointer set to a pre-calculated worst-case value guaranteed to leave sufficient space in

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the stack beneath the stack pointer for any preemptive tasks for task suspended/restored operations ([Lake], Abstract).

### ***Conclusion***

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- C. L. Liu, Scheduling Algorithms for multiprogramming in a Hard-Real-Time Environment, January 1, 1973, ACM.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ben C. Wang whose telephone number is 571-270-1240. The examiner can normally be reached on Monday - Friday, 8:00 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nabil El-Hady can be reached on 571-272-2333. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



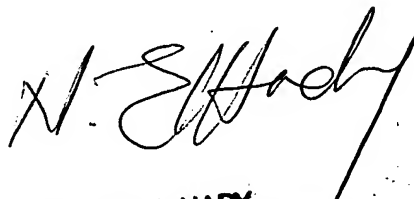
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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BCW

*for C. Wang*

October 11, 2006



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SUPERVISORY PATENT EXAMINER